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EXAMINER

AMARI, ALESSANDRO V

ART UNIT PAPER NUMBER

2872

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/648,525

Applicant(s)

DAVIS ET AL.

Examiner

Alessandro V. Amari

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 06 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37, 39, 40, 42-47, 49-54, 56, 58-68 and 70 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-37, 39, 40, 42-47, 49-54, 56, 58-68 and 70 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11/10/03 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-37, 39, 40, 42-47, 49-54, 56, 58-68 and 70 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In regard to claims 1, 22, 32, 37 and 58, the negative limitation "the desired effective filter function being very difficult or substantially impossible to produce by a single grating" is not adequately described nor does it have basis in the original disclosure. As such, it constitutes new matter.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-37, 39, 40, 42-47, 49-54, 56, 58-68 and 70 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In regard to claims 1, 22, 32, 37 and 58, the phrase "the desired effective filter function being very difficult or substantially impossible to produce by a single grating" is

indefinite. Specifically the terms "very difficult or substantially impossible" are vague and ambiguous and do not allow one of ordinary skill in the art to interpret the claims with a reasonable degree of clarity and distinctness.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-6, 8, 9, 11, 12, 15, 32-34, 36, 43, 44, 45, 47, 58-62, 64, and 66-68 rejected under 35 U.S.C. 102(b) as being anticipated by Li US Patent 5,841,918.

In regard to claims 1, 32 and 58, Li discloses (see Figure 1) a tunable optical filter or a method for selectively filtering an optical wavelength band from an input light comprising: providing a first optical element or first optical waveguide including a first reflective element (14) for receiving light and reflecting a first wavelength band of the light centered at a first reflection wavelength, the first reflective element characterized by a first reflective filter function produced by a first grating having a first amplitude profile as described in column 3, lines 45-54 and as shown in Figure 2a; and providing a second optical element or second optical waveguide, optically connected to the first optical element to receive the reflected first wavelength band of the light, including a second reflective element (16) for reflecting a second wavelength band of the light centered at a second reflection wavelength, the second reflective element characterized by a second reflective filter function produced by a second grating having a second

amplitude profile that is different than the first amplitude profile as shown in Figures 2a and 2b; and the first wavelength band and the second wavelength band overlap spectrally or are substantially aligned as described in column 4, lines 1-18, the second optical element or second optical waveguide providing an optical filter signal having a desired effective filter function with a desired amplitude profile that is different from amplitude profiles of the first and second reflective filter functions, the desired effective filter function being very difficult or substantially impossible to produce by a single grating as shown in Figures 2a and 2b and as described in column 4, lines 1-13.

Regarding claims 2 and 59, Li discloses that one of the first and second optical elements or optical waveguides is tunable to change the corresponding first or second reflection wavelength as described in column 3, lines 58-67 and column 4, lines 1-18.

Regarding claims 3 and 60, Li discloses that both of the first and second optical elements or optical waveguides is tunable to change each of the first and second reflection wavelengths as described in column 3, lines 58-67 and column 4, lines 1-18.

Regarding claims 4 and 61, Li discloses (see Figure 1) an optical directing device (12) optically connected to the first and second optical elements or optical waveguides; the optical directing device directing the light to the first reflective element, directing the first wavelength band reflected from the first reflective element to the second reflective element, and directing the second wavelength band reflected from the second reflective element to the output port of the optical directing device as shown in Figure 1 and as described in column 3, lines 41-59.

Regarding claim 5, Li discloses that the optical directing device comprises at least one circulator as described in column 3, line 16.

Regarding claim 6, Li discloses (see Figure 6) that the circulator receives the light at a first port of the circulator, directs the light to the first reflective element through a second port of the circulator, receives the first wavelength band at the second port, directs the first wavelength band to the second reflective element through a third port of the circulator, receives the second wavelength band at the third port, and directs the second wavelength band to a fourth port of the circulator as described in column 5, lines 40-61.

Regarding claim 8, Li discloses that the first reflection wavelength and the second reflection wavelength are substantially aligned to reflect a portion of the aligned wavelength bands to an output port as described in column 4, lines 1-18.

Regarding claims 9, 44 and 62, Li discloses that one of the first and second reflective filter functions comprises one of a Gaussian, rectangular and ramp shape as shown in Figure 2a, 2b.

Regarding claim 11 and 36, Li discloses that the first reflection wavelength is offset a predetermined spacing from the second reflection wavelength or wherein tuning one of the first and second reflective elements comprises offsetting a first reflection wavelength and a second reflection wavelength by a predetermined spacing as shown in Figures 2a-2c and as described in column 4, lines 1-13.

Regarding claims 12 and 45, Li discloses that at least one of the first and second optical elements have an outer cladding and an inner core disposed therein, wherein

the at least one of the first and second reflective element comprises a grating disposed in a longitudinal section of the inner core as described in column 3, lines 16-18.

Although the prior art does not specifically disclose the claimed outer cladding, inner core with the grating disposed in a longitudinal section of the inner core, this feature is seen to be an inherent teaching of that device since the waveguide or fiber Bragg grating is disclosed and it is apparent that the grating must have a core and cladding and gratings are written in a longitudinal section of cores.

Regarding claims 15, 47 and 66, Li discloses that at least one of the first and second optical elements or optical waveguides is an optical fiber as described in column 3, lines 16-18.

Regarding claim 33, Li discloses that tuning one of the first and second reflective elements includes compressing the one of the first and second optical elements as described in column 3, lines 19-24.

Regarding claim 34, Li discloses that tuning one of the first and second reflective elements comprises substantially aligning a first reflection wavelength and the second reflection wavelength as described in column 4, lines 1-18.

Regarding claim 43, Li discloses tuning the other one of the first and second reflective elements to overlap spectrally the first wavelength band and the second wavelength band as shown in Figure 2c.

Regarding claim 64, Li teaches that at least one of the first and second reflective elements includes a Bragg grating as described in column 3, lines 14-18.

Regarding claim 67, Li discloses a compression device that axially compresses at least one of the first and second tunable optical waveguides, wherein at least one of the respective first and second reflective elements is disposed along an axial direction of the respective first and second optical waveguides as described in column 3, lines 19-40.

Regarding claim 68, Li discloses that the shape of the first reflective filter function is different than the shape of the second reflective filter function as described in column 3, lines 45-67 and as shown in Figures 2a and 2b.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li U.S. Patent 5,841,918 in view of Kringlebotn et al. U.S. Patent 6,097,487.

Regarding claim 7, Li teaches the invention as set forth above but does not teach that said optical directing device comprises an optical coupler. Kringlebotn et al. teaches the optical directing device comprises an optical coupler (4) as shown in Figure 5 and as described in column 5, lines 52-67 and column 6, lines 1-10. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize couplers as taught by Kringlebotn et al. in the optical filter of Li in order to optically direct the signals in the filter device.

9. Claims 10, 35 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li U.S. Patent 5,841,918 in view of Kewitsch et al. U.S. Patent 6,236,782.

Regarding claims 10, 35, and 63, Li teaches the invention as set forth above but does not teach that one of the first and second reflective elements is fully apodized and the other of the first and second reflective elements is partially apodized. Kewitsch et al. teaches that one of the first and second reflective elements is fully apodized and the other of the first and second reflective elements is partially apodized as described in column 10, lines 39-67 and column 11, lines 1-10. It would have been obvious to one having ordinary skill in the art at the time the invention was made to apodize the reflective elements of Li as taught by Kewitsch et al. in order to reduce grating sidelobes and eliminate adjacent channel crosstalk.

10. Claims 13, 14, 16-19, 22-27, 29, 30, 37, 39, 40, 42, 46, 49, 50, 51, 53, 54, 56, 65 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li U.S. Patent 5,841,918 in view of Fernald et al. U.S. Patent 6,229,827.

Regarding claims 13, 14, 16-19, 20, 21, 46 and 65, Li teaches the invention as set forth above and further in regard to claim 22, Li teaches (see Figure 1) a first reflective element (14) for receiving light and reflecting a first wavelength band of the light centered at a first reflection wavelength, the first reflective element characterized by a first reflective filter function produced by a first grating having a first amplitude profile as described in column 3, lines 45-54 and as shown in Figure 2a; and providing a second optical element or second optical waveguide, optically connected to the first optical element to receive the reflected first wavelength band of the light, including a

second reflective element (16) for reflecting a second wavelength band of the light centered at a second reflection wavelength, the second reflective element characterized by a second reflective filter function produced by a second grating having a second amplitude profile that is different than the first amplitude profile as shown in Figures 2a and 2b; and the first wavelength band and the second wavelength band overlap spectrally or are substantially aligned as described in column 4, lines 1-18, the second optical element or second optical waveguide providing an optical filter signal having a desired effective filter function with a desired amplitude profile that is different from amplitude profiles of the first and second reflective filter functions, the desired effective filter function being very difficult or substantially impossible to produce by a single grating as shown in Figures 2a and 2b and as described in column 4, lines 1-13.

Regarding claim 23, Li teaches that the first and second reflective elements include a respective Bragg grating as described in column 3, lines 14-18.

Regarding claim 25, Li teaches that an optical directing device (12) is connected to the optical waveguides, the optical directing device directing the light to the first reflective element, directing the first wavelength band reflected from the first reflective element to the second reflective element as shown in Figures 1, 3-6.

Regarding claim 26, Li teaches that the optical directing device is an optical circulator as described in column 3, lines 14-16.

Regarding claim 28, Li teaches that the first and second reflection wavelengths are substantially aligned as described in column 4, lines 1-18.

Regarding claim 29, Li teaches that the shape of the first reflective filter function is different than the shape of the second reflective filter function as shown in Figures 2a-2c.

Regarding claim 30, Li teaches that the first and second reflection wavelengths are offset by a predetermined spacing as shown in Figures 2a-2c.

Regarding claim 39 and 51, Li teaches that one of the first and second reflective filter functions comprises one of a Gaussian, rectangular and ramp shape as shown in Figures 2a-2c.

In regard to claim 37, Li teaches (see Figure 1) a compression-tuned optical filter comprising: a first optical waveguide including a first reflective element (14) for receiving light and reflecting a first wavelength band of the light centered at a first reflection wavelength, the first reflective element characterized by a first reflective filter function as described in column 3, lines 45-54; and a second optical waveguide, optically connected to the first optical waveguide to receive the reflected first wavelength band of the light, including a second reflective element (16) for reflecting a second wavelength band of the light centered at a second reflection wavelength, the second reflective element characterized by a second reflective filter function produced by a second grating having a second amplitude profile, and the first wavelength band and the second wavelength band overlap spectrally, the second optical waveguide providing an optical filter signal having a desired effective filter function with a desired amplitude profile that is different from amplitude profiles of the first and second reflective filter functions, the

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desired effective filter function being very difficult or substantially impossible to produce by a single grating as shown in Figures 2a-2c and as described in column 4, lines 1-13.

Regarding claim 42, Li teaches that the shape of the first reflective filter function is different than the shape of the second reflective filter function as shown in Figures 2a-2c.

Regarding claim 49, Li teaches that both of the first and second optical waveguides is tunable to change each of the respective first and second reflection wavelengths as described in column 3, lines 19-24.

Regarding claim 50, Li teaches that the first and second reflection wavelengths are substantially aligned as described in column 4, lines 1-18.

Regarding claim 53, Li teaches that the first reflection wavelength is offset a predetermined spacing from the second reflection wavelength as shown in Figures 2a and 2b.

Regarding claim 54, Li teaches that at least one of the first and second reflective elements includes a Bragg grating as described in column 3, lines 14-18.

Regarding claim 70, Li teaches that the first wavelength band and the second wavelength band overlap spectrally as shown in Figures 2a-2c.

However, regarding claim 13, Li does not teach that at least one of the first and second optical elements comprises an optical fiber, having a reflective element written therein; and a tube, having the optical fiber and the reflective element encased therein along a longitudinal axis of the tube, the tube being fused to at least a portion of the fiber or regarding claims 14, 46 and 65, that at least one of the first and second optical

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elements or waveguides has an outer transverse dimension of at least 0.3 mm or regarding claim 16, a compressing device that axially compresses at least one of the first and second optical elements wherein at least one of the first and second reflective elements is disposed along an axial direction of each respective first and second optical elements or in regard to claim 17, that first and second compressing devices for compressing axially the first and second optical elements or in regard to claim 18 that a straining device for tensioning axially the first optical element to tune the first reflective element, wherein the first reflective element is disposed along an axial direction of the first optical element as disclosed or regarding claim 19, a heating element for varying the temperature of the first optical element to tune the first reflective element to reflect the selected first wavelength band. In regard to claim 22, Li does not teach that the tunable optical waveguide comprises a first inner core having the first reflective element disposed therein and a second inner core having the second reflective element disposed therein. Regarding claims 24 and 65, Li does not teach that the tunable optical waveguide has an outer transverse dimension of at least 0.3 mm nor regarding claim 25 does Li teach that the optical directing device is connected to the first and second inner cores nor regarding claim 27 does Li teach further including a compressing device for axially compressing the tunable optical waveguide to tune the first and second reflective elements nor regarding claim 37 does Li teach wherein the at least one of the first and second optical waveguides has outer dimensions along perpendicular axial and transverse directions, a first portion of the at least one of the first and second optical waveguides having an outer dimension being at least 0.3 mm

along said transverse direction, at least a portion of the first portion having a transverse cross-section which is continuous and comprises a substantially homogeneous material; and the at least one of the first and second optical waveguides being axially strain compressed so as to change the at least one of the first and second reflection wavelengths. Regarding claim 56, Li does not teach that the optical filter further includes a compression device that axially compresses at least one of the first and second optical waveguides, wherein at least one of the respective first and second reflective elements is disposed along an axial direction of the respective first and second tunable elements.

Regarding claim 13, Fernald et al. teaches that (see Figure 1) at least one of the first and second optical elements comprises: an optical fiber (10), having a reflective element (12) written therein; and a tube (20), having the optical fiber and the reflective element encased therein along a longitudinal axis of the tube, the tube being fused to at least a portion of the fiber as described in column 4, lines 23-25.

Regarding claims 14, 24, 46 and 65, Fernald et al. also teaches that at least one of the first and second optical elements or waveguides has an outer transverse dimension of at least 0.3 mm as described in column 1, lines 60-61.

Regarding claims 16, 27 and 56, Fernald et al. also discloses a compressing device for compressing simultaneously and axially the first and second tunable optical elements or the tunable optical waveguide, wherein each of the first and second reflective elements are disposed along an axial direction of each respective first and

second tunable element as described in column 1, lines 57-67 and column 2, lines 1-3 and lines 42-44.

Regarding claim 17, Fernald et al teaches first and second compressing devices for compressing axially the first and second optical elements respectively as described in column 1, lines 57-67 and column 2, lines 1-4.

Regarding claim 18, Fernald et al. teaches a straining device for tensioning axially the first optical element to tune the first reflective element, wherein the first reflective element is disposed along an axial direction of the first optical element as disclosed in column 2, lines 1-3.

Regarding claim 19, Fernald et al teaches a heating element for varying the temperature of the first optical element to tune the first reflective element to reflect the selected first wavelength band as described in column 1, lines 41-49.

Regarding claim 22, Fernald et al teaches (see Figure 9, 10, 11) a tuneable optical waveguide, the optical waveguide comprising a first inner core with a first reflective element disposed therein, a second inner core having a second reflective element disposed therein as described in column 11, lines 46-55.

Regarding claim 25, Fernald et al teaches that an optical directing device optically connected to first and second inner cores as described in column 11, lines 46-55.

In regard to claim 37, Fernald et al. teaches that the at least one of the first and second optical waveguides has outer dimensions along perpendicular axial and transverse directions, a first portion of the at least one of the first and second optical

waveguides having an outer dimension being at least 0.3 mm along said transverse direction as described in column 1, lines 60-61, at least a portion of the first portion having a transverse cross-section which is continuous and comprises a substantially homogeneous material as described in column 1, lines 65-67; and the at least one of the first and second optical waveguides being axially strain compressed so as to change the at least one of the first and second reflection wavelengths as described in column 2, lines 1-3.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the compression tuned grating as taught by Fernald et al. in the optical system of Li in order to provide for precise tuning of the filter.

11. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li U.S. Patent 5,841,918 in view of Putnam et al. U.S. Patent 6,310,990.

Regarding claims 20 and 21, Li teaches the invention as set forth above but does not further teach a first compressing device for axially compressing at least the first tunable optical element to tune the first reflective element, responsive to a displacement signal, wherein the first reflective element is disposed axially along the first tunable element; and a displacement sensor, responsive to the compression of the first tunable optical element, for providing the displacement signal indicative of the change in the displacement of the first tunable optical element or wherein the displacement sensor includes a capacitance sensor coupled to the first tunable optical element for measuring the change in the capacitance that depends on the change in the displacement of the first tunable optical element.

Regarding claims 20 and 21, Putnam et al. does teach (see Figure 2) a first compressing device (50) for axially compressing at least the first tunable optical element to tune the first reflective element, responsive to a displacement signal, wherein the first reflective element is disposed axially along the first tunable element as shown in Figure 1; and a displacement sensor (24), responsive to the compression of the first tunable optical element, for providing the displacement signal indicative of the change in the displacement of the first tunable optical element as described in column 5, lines 51-67 and column 6, lines 1-6 or wherein the displacement sensor includes a capacitance sensor (72, 74) coupled to the first tunable optical element for measuring the change in the capacitance that depends on the change in the displacement of the first tunable optical element as described in column 6, lines 1-6.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optical structure as taught by Putnam et al. in the optical filter system of Li in order to provide feedback control for the tuning of the optical filter.

12. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over are rejected under 35 U.S.C. 103(a) as being unpatentable over Li U.S. Patent 5,841,918 in view of Fernald et al. U.S. Patent 6,229,827 and further in view of Putnam.

In regard to claim 31, Li in view of Fernald et al teaches the invention as set forth above but does not teach a first compressing device for axially compressing at least the first tunable optical element to tune the first reflective element, responsive to a displacement signal, wherein the first reflective element is disposed axially along the

first tunable element; and a displacement sensor, responsive to the compression of the first tunable optical element, for providing the displacement signal indicative of the change in the displacement of the first tunable optical element or wherein the displacement sensor includes a capacitance sensor coupled to the first tunable optical element for measuring the change in the capacitance that depends on the change in the displacement of the first tunable optical element.

Regarding claim 31, Putnam et al. does teach (see Figure 2) a first compressing device (50) for axially compressing at least the first tunable optical element to tune the first reflective element, responsive to a displacement signal, wherein the first reflective element is disposed axially along the first tunable element as shown in Figure 1; and a displacement sensor (24), responsive to the compression of the first tunable optical element, for providing the displacement signal indicative of the change in the displacement of the first tunable optical element as described in column 5, lines 51-67 and column 6, lines 1-6 or wherein the displacement sensor includes a capacitance sensor (72, 74) coupled to the first tunable optical element for measuring the change in the capacitance that depends on the change in the displacement of the first tunable optical element as described in column 6, lines 1-6.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optical structure as taught by Putnam et al. in the optical filter system of Li in order to provide feedback control for the tuning of the optical filter.

13. Claim 40 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li U.S. Patent 5,841,918 in view of Fernald et al U.S. Patent 6,229,827 further in view of Kewitsch et al. U.S. Patent 6,236,782.

Regarding claims 40 and 52, Li in view of Fernald et al teaches the invention as set forth above but does not teach that one of the first and second reflective elements is fully apodized and the other of the first and second reflective elements is partially apodized.

Regarding claims 40 and 52, Kewitsch et al. teaches that one of the first and second reflective elements is fully apodized and the other of the first and second reflective elements is partially apodized as described in column 10, lines 39-67 and column 11, lines 1-10.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to apodize the reflective elements of Li as taught by Kewitsch et al. in order to reduce grating sidelobes and eliminate adjacent channel crosstalk.

Response to Arguments

14. Applicant's arguments filed 06 October 2003 have been fully considered but they are not persuasive.

The Applicant argues that Li merely discloses a demultiplexer optical device and does not teach taking two optical elements having different grating amplitude profiles and using them to provide a desired effective filter function having a different amplitude profile than the optical signals being used to produce the same, and that it is very difficult or substantially impossible to produce by a single grating and further that the

combined amplitude profile shown in Figure 2c of Li would not be very difficult or substantially impossible to produce by a single grating.

In response to this argument, the Applicant is reminded that the rejection is based upon the claim recitation. Li clearly teaches an optical filter having two optical elements or gratings (14, 16 in Figure 1) each having different amplitude profiles (see Figures 2a, 2b, respectively) and using them to provide a desired effective filter function having a different amplitude profile than the optical signals used to produce the same (as shown in Figure 2c) as claimed. Further, the Examiner has invoked a 35 USC 112 rejection in regard to the recitation, "the desired effective filter function being very difficult or substantially impossible to produce by a single grating" as not being described in the specification and as being indefinite. Specifically the terms "very difficult or substantially impossible" are vague and ambiguous and do not allow one of ordinary skill in the art to interpret the claims with a reasonable degree of clarity and distinctness. Further, the Applicant has provided no evidence that the combined amplitude profile shown in Figure 2c of Li would not be very difficult or substantially impossible to produce by a single grating.

The Applicant further argues in regard to claims 22 and 58, that Li does not teach that the center wavelengths of the filter functions are substantially aligned and that Li teaches away from aligning the first and second reflection wavelengths to reflect a portion of the aligned wavelength bands to an output port.

In response to this argument, the Applicant's attention is directed to column 4, lines 1-18 and Figure 2c of Li, which clearly describe and show center wavelengths of

filter functions being substantially aligned to reflect a portion of the aligned wavelength bands to an output port. Further, the Applicant offers no evidence or support for his assertion that Li teaches away from aligning the first and second reflection wavelengths.

The Applicant further argues that Li does not teach a dual core waveguide as claimed.

In response to this argument, the Examiner wishes to point out that it is the combination of Li in view of Fernald et al which teaches a dual core waveguide as claimed.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (703) 306-0533. On January 20, 2004, the telephone number will be changed to (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (703) 305-0024. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ava *ava*
24 December 2003


DREW DUNN
SUPERVISORY PATENT EXAMINER